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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/986,109	11/07/2001	Kimikazu Matsumoto	N01300US	4933

7590 03/26/2004  
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EXAMINER	
SEFER, AHMED N	
ART UNIT	PAPER NUMBER
2826	

DATE MAILED: 03/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/986,109	<b>Applicant(s)</b> MATSUMOTO ET AL.	
	<b>Examiner</b> A. Sefer	<b>Art Unit</b> 2826	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 01 March 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) 7-24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All   b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

#### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)                      4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)                      5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_                      6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Election/Restrictions***

1. Applicant's election without traverse of Embodiment 1 (claims 1-6) is acknowledged.

***Specification***

2. Claim 1 is objected to because of the following informalities: Although the claims are interpreted in light of the specification, it is suggested that the term "column density" be expressed in terms of number of spacers and number of pixels. Appropriate correction is required.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murouchi et al ("Murouchi") (JP 10-186374) in view of Ishihara et al. ("Ishihara") USPN 6,522,379.

Murouchi discloses in figs. 1-6 a liquid crystal display device comprising: a columnar spacer 5 being interposed between a color filter substrate 10 and a thin film transistor substrate 8; and wherein a column density of said columnar spacer is smaller than 1 (one) and wherein said columnar spacer is disposed in two unit pixels 2 being adjacent to each other, but does not disclose unit pixels bearing a signal charge opposite in polarity.

Ishihara discloses in figs. 45 and 49 a liquid crystal display device comprising: a columnar spacer 203 being interposed between a color filter substrate 201 and a thin film

transistor substrate 202 wherein said columnar spacer is disposed in two unit pixels being adjacent to each other and said each bearing a signal charge opposite in polarity indicating a dot reverse driving method (as in claim 2).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to incorporate Ishihara's teachings with Murouchi's device since that would facilitate spray to bend transition as taught by Ishihara.

As for claim 3, Ishihara discloses columnar spacer disposed on a gate electrode 61 of said thin film transistor formed on said thin film transistor substrate.

As for claim 4, Ishihara discloses in fig. 3 a pixel electrode 22b and a common electrode 22a formed on said thin film transistor substrate in a manner that said pixel electrode and said common electrode are insulated from each other.

4. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishikawa et al. ("Ishikawa") USPN 6,414,733 in view of Ishihara et al. ("Ishihara") USPN 6,522,379.

Ishikawa discloses (see figs. 4 and 5 and col. 14, lines 43-47) a liquid crystal display device comprising: a columnar spacer 18 being interposed between a color filter substrate 2" and a thin film transistor substrate 3; and wherein a column density of said columnar spacer is smaller than 1 (one) and wherein said columnar spacer is disposed in two unit pixels being adjacent to each other, but does not disclose and two unit pixels bearing a signal charge opposite in polarity.

Ishihara discloses in figs. 45 and 49 a liquid crystal display device comprising: a columnar spacer 203 being interposed between a color filter substrate 201 and a thin film transistor substrate 202 wherein said columnar spacer is disposed in two unit pixels being

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adjacent to each other and said each bearing a signal charge opposite in polarity indicating a dot reverse driving method (as in claim2).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to incorporate Ishihara's teachings with Ishikawa's device since that would facilitate spray to bend transition as taught by Ishihara.

As for claim 3, Ishihara discloses columnar spacer disposed on a gate electrode 61 of said thin film transistor formed on said thin film transistor substrate.

As for claim 4, Ishihara discloses in fig. 3 a pixel electrode 22b and a common electrode 22a formed on said thin film transistor substrate in a manner that said pixel electrode and said common electrode are insulated from each other.

5. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shibahara (JP 2000-305089) in view of Ishihara et al. ("Ishihara") USPN 6,522,379.

Shibahara discloses in figs. 1-3 a liquid crystal display device comprising: a columnar spacer 21 being interposed between a color filter substrate 13 and a thin film transistor substrate 6; and wherein a column density of said columnar spacer is smaller than 1 (one) and wherein said columnar spacer is disposed in two unit pixels being adjacent to each other, but does not disclose and two unit pixels bearing a signal charge opposite in polarity.

Ishihara discloses in figs. 45 and 49 a liquid crystal display device comprising: a columnar spacer 203 being interposed between a color filter substrate 201 and a thin film transistor substrate 202 wherein said columnar spacer is disposed in two unit pixels being adjacent to each other and said each bearing a signal charge opposite in polarity indicating a dot reverse driving method (as in claim 2).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to incorporate Ishihara's teachings with Ishikawa's device since that would facilitate spray to bend transition as taught by Ishihara.

As for claim 3, Ishihara discloses columnar spacer disposed on a gate electrode 61 of said thin film transistor formed on said thin film transistor substrate.

As for claim 4, Ishihara/ Shibahara discloses in fig. 3 a pixel electrode 22b/3 and a common electrode 22a/2 formed on said thin film transistor substrate in a manner that said pixel electrode and said common electrode are insulated from each other.

6. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tamatani et al. ("Tamatani") US PG-Pub 2001/0052959 in view of Shibahara (JP 2000-305089).

Tamatani discloses (see figs. 1-3, 6-8 and pars. 0045-0047) liquid crystal display device comprising: a color filter substrate 12 on which a colored layer is formed so that unit pixels are arranged in a matrix form; a thin film transistor substrate 11 on which thin film transistors are formed at a place being opposite to said colored layer; a columnar spacer 23 formed to secure a cell gap being disposed between said color filter substrate and thin film transistor substrate; and wherein a liquid crystal is put into said cell gap in a hermetically sealed manner and wherein a columnar area ratio being a ratio of a cross sectional area of said columnar spacer to an area of said unit pixel is set within a range recited in the claim, but does not specifically disclose that each said columnar spacer making up a pair of said columnar spacers is disposed in each of two unit pixels being arranged in a matrix form and being adjacent to each other at an arbitrary place along a row direction or column direction.

Shibahara discloses in figs. 1-3 liquid crystal display device comprising: a color filter substrate 13 on which a colored layer is formed so that unit pixels are arranged in a matrix form; a thin film transistor substrate 6 on which thin film transistors are formed at a place being opposite to said colored layer; a columnar spacer 21 formed to secure a cell gap being disposed between said color filter substrate and thin film transistor substrate; wherein said columnar spacer making up a pair of said columnar spacers is disposed in each of two unit pixels being arranged in a matrix form and being adjacent to each other at an arbitrary place along a row direction or column direction.

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to incorporate Shibahara's teachings with Tamatani's device since that would prevent occurrence of bubbles as taught by Shibahara.

7. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tamatani in view of Shibahara as applied to claim 5 above, and further in view of Lien USPN 5,907,380.

The combined reference disclose the device structure as recite in the claim, but do not specifically disclose a driving method.

Lien disclose (see fig. 16-18 and col. 8, lines 50-67 and col. 9, lines 1-20) disclose both dot reverse driving method and a gate line reverse driving method.

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to incorporate the teachings of Lien since that would provide a tilt direction control as taught by Lien.

8. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tamatani et al. ("Tamatani") US PG-Pub 2001/0052959 in view of Murouchi et al ("Murouchi").

Tamatani discloses (see figs. 1-3, 6-8 and pars. 0045-0047) liquid crystal display device comprising: a color filter substrate 12 on which a colored layer is formed so that unit pixels are arranged in a matrix form; a thin film transistor substrate 11 on which thin film transistors are formed at a place being opposite to said colored layer; a columnar spacer 23 formed to secure a cell gap being disposed between said color filter substrate and thin film transistor substrate; and wherein a liquid crystal is put into said cell gap in a hermetically sealed manner and wherein a columnar area ratio being a ratio of a cross sectional area of said columnar spacer to an area of said unit pixel is set within a range recited in the claim, but does not specifically disclose that each said columnar spacer making up a pair of said columnar spacers is disposed in each of two unit pixels being arranged in a matrix form and being adjacent to each other at an arbitrary place along a row direction or column direction.

Murouchi discloses in figs. 1-6 liquid crystal display device comprising: a color filter substrate 10 on which a colored layer is formed so that unit pixels 2 are arranged in a matrix form; a thin film transistor substrate 8 on which thin film transistors are formed at a place being opposite to said colored layer; a columnar spacer 5 formed to secure a cell gap being disposed between said color filter substrate and thin film transistor substrate; wherein said columnar spacer making up a pair of said columnar spacers is disposed in each of two unit pixels being arranged in a matrix form and being adjacent to each other at an arbitrary place along a row direction or column direction.

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to incorporate Murouchi's teachings with Tamatani's device since that would provide a stable operation as taught by Murouchi.




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8. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tamatani in view of Murouchi as applied to claim 5 above, and further in view of Lien USPN 5,907,380.

The combined references disclose the device structure as recite in the claim, but do not specifically disclose a driving method.

Lien discloses (see fig. 16-18 and col. 8, lines 50-67 and col. 9, lines 1-20) disclose both dot reverse driving method and a gate line reverse driving method.

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to incorporate the teachings of Lien since that would provide a tilt direction control as taught by Lien.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to A. Sefer whose telephone number is (571) 272-1921.  **NATHAN J. FLYNN**  
**SUPERVISORY PATENT EXAMINER**  
**TECHNOLOGY CENTER 2800**

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on (571) 272-1915.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272-2800.

ANS  
March 14, 2004